



Hardy Fern Foundation Quarterly



Spring 2010

THE HARDY FERN FOUNDATION

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Revised Edition, due to a software issue some of the graphics printed improperly.

Our apologies - Impression Printing

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Bellevue Botanical Garden, Bellevue, WA, Lakewold, Tacoma, Washington, Lotusland, Santa Barbara, California, Les Jardins de Metis, Quebec, Canada, Rotary Gardens, Janesville, WI, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

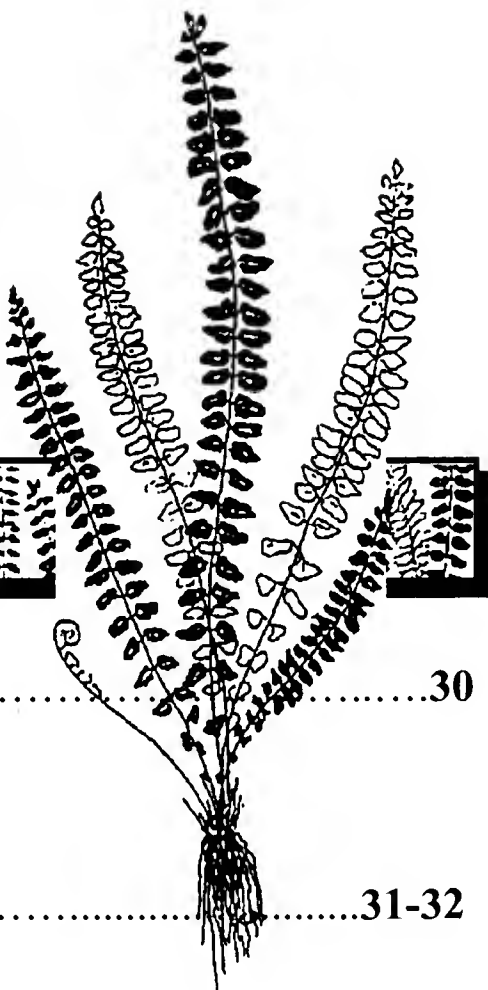
THE HARDY FERN FOUNDATION QUARTERLY

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President's Message

As I sit here writing this message, I can't help feeling invigorated by a mild, sunny fourth day of spring, 2010 in the Pacific Northwest.

Our organization has had an active, assiduous winter with numerous projects and events. Michelle Bundy and Richie Steffen designed a very attractive, educational exhibit, featuring the Hardy Fern Foundation Fern Stumpery for our display at the Pacific Northwest Flower and Garden Show, February 3-7, 2010 in Seattle, Washington. Attendees showed great interest in the concept and many made plans to visit our display garden at some future time.

We are progressing toward finalization of our working agreement with the Rhododendron Species Foundation, which would provide a long term lease for our office space and new hoop house. This would be based on existing rental values in the area. It has been a long journey identifying all of the items and services shared by our organizations.

Mid March was celebrated by the annual "grooming of the ferns" in the Bellevue Botanical Garden, with the enjoyment of a bonus dry, sunny day for six, or so board members. Afterward, we took a short hike to the site of a future "Ravine Garden" which will feature a suspension bridge, providing an overhead view of numerous plantings below. It is our hope to be able to plant some larger ferns, in the future, perhaps, even tree ferns, providing there is sufficient protection.

Excitement is building for our upcoming Fern Festival and sale on June 4 and 5, 2010. Our Friday evening featured speaker will be David Schwartz from Bakersfield, California. His specialties includes xeric and California native ferns and fern allies. A group of us had the privilege of accompanying him on a field trip in central California last fall. It was followed by a tour of his rock garden which features an extensive collection of beautifully grown xeric ferns. This should be an exciting and informative lecture.

In the category of future projects, we can list: A Memorial Fern Garden to Digs and the late Doctor Jack Docter, to be installed at the new Bellevue branch of Children's Hospital Clinic and Surgery Center, opening summer, 2010. We are also considering designing and constructing a vertical or wall garden, featuring ferns, at some location to be determined. I feel that we have the knowledge and expertise in our group to successfully achieve this goal. And as mentioned above, we hope to introduce large ferns at Bellevue Botanical Garden's future ravine garden.

We are always on a quest for more involvement by our members in the numerous projects, sales and maintenance of our display gardens. This is an opportunity to socialize and participate in "old fashioned" fun. Your suggestions are always welcome.

Have a happy and green spring.

Best Regards,
Patrick D. Kennar

Discovery and Development of the *Polystichum setiferum* cv. 'Smith's Cruciate'

Ray Smith
West Midlands, England

I first noticed the fern when visiting a garden open day at one of the local villages early in the 1980's. My attention was immediately drawn to a distinctive 'cruciate' feature running down the length of the frond which was unusually narrow and very irregular. I informed the owner that it may botanically be something rather special and informed A.R. (Matt) Busby then General Secretary of the BPS who on inspection, confirmed that it may well be.

Further discussion with the current owner revealed he had been given the fern by someone now deceased who had moved up from the South (Devon or Cornwall) around the 1920's and this might possibly be a clue to its original source. Not being very interested he generously offered me the plant, an offer I gratefully accepted!

The spores and bulbils were duly propagated and I found the spores did not come true. The product was like a Pandora's box of mixed cultivars of various shapes and nothing very special. The bulbils however were more consistent and developed into relatively true specimens which included the unfortunate and irregular variation in the length of the pinna in many of the fronds. Since this was unsatisfactory I pursued a programme of selective propagation by only cultivating the bulbils from those fronds that were fairly regular. This does seem to have been successful in reducing the unpredictable variation in frond width and giving a more regular 'strap like' appearance.

Pressings of the frond were forwarded to J.W.(Jimmy) Dyce who expressed great interest in the progress. In addition I am deeply grateful for the advice, encouragement and support given to me by Matt Busby over the years. He kept an eye on developments and was always available for reference.

Ultimately, I was able to present a pot of this fern with much improved narrow but regular fronds for the exhibition at Fibrex Nurseries at Pebworth in celebration of the BPS 100th Anniversary in 1991. It attracted considerable interest among visitors from home and overseas. Several live samples were requested and willingly given to



Reproduced with permission from
Polystichum Cultivars,
J.W. Dyce et. al. 2005.


interested parties at home and abroad.

May I also draw your attention to the publication *Polystichum Cultivars* by J .W. Dyce published posthumously in an edited and expanded edition by Robert Sykes and Martin Rickard. They identified the fern as “*P. setiferum* (Cruciatum Group) 'Smith's Cruciate'”. It is very accurately described and illustrated for which they are to be commended. (“.....It has very upright and rigid fronds, up to 30 inches [75 cm] in length. Coupled with their extreme narrowness, not more than 2 inches [5 cm] at their widest parts and little more than 1 inch [2.5 cm] in their upper halves, this makes the plant very eye-catching and the effect is enhanced by the slight graceful curve of the fronds.....”) I recommend reference to the work for anyone seeking a professional view.

Reference:

Polystichum Cultivars Variation in the British shield ferns, (2005). J. W. Dyce et. al., British Pteridological Society, Natural History Museum, London.

Welcome New Members



Megan Aumiller
Juanita Blumberg
David Brown
Phil Davidson
Miriam Glickman
Mr. Alec Greening
Ruth Keogh
Sydney Kohlmeier
Gary Maule
Keith Maw
Tony Parr
Pete Veilleux

California Ferning – Part 2

3 October

Tom Stuart

We headed north up the coast, passing through San Francisco, and pausing for a photo op under the approach to the Golden Gate Bridge. (photo page 51.) While the rest of the tourists were clicking the iconic bridge, this busload was focused on *Polypodium californicum* clothing the buttress walls and *Polystichum munitum* footing them.

In need of sustenance at 10:30 AM we pulled up to the Rodney Strong winery, goggled the vats, and sampled the wares. Rodney didn't make much money.

On our first roadside stop halfway to Mendocino, I looked out of the window and thought there is nothing of interest here. I was a sluggard getting off the bus. It is conceivable you would feel the same. *Adiantum jordanii* totally shriveled, under nearly leafless California buckeye, *Aesculus californica*, was accompanied by *Pentagramma triangularis*, the goldback fern exhibiting the same lifeless condition. This bank, likely rainless since May, nonetheless is not entirely brown or grey; *Polypodium calirhiza* looked decent, if not perky, but there was a star performance by *Dryopteris arguta* the coastal wood fern with its sori ripe and ready, despite all these months of drought. (Photo page 40.)

Our next destination was the Mendocino Coast Botanical Gardens in Fort Bragg, running nearly half a mile from the Route 1 main thoroughfare to the Pacific shore. Near the parking lot and offices the gardens are geared towards horticultural education with perennial displays. Moving towards the sea, areas are dedicated to heathers, camellias, and rhododendrons, eventually supplanted by the native flora as the ocean is approached. A fern canyon midway was loaded with *Polystichum munitum*.

A horticultural high point for pteridophobiacs was its heather collection. There are also many old rhododendrons, and one assumes it was once a must-see, but the demise of the mature canopy in the last few decades plus a look of chlorosis in numerous specimens gave the collection a patchy appearance. On the other hand, added light gave the lady fern, *Athyrium filix-femina*, an opportunity and they were large and abundant perhaps due to frequent fog, and in rather good shape for so late in the season.

Other ubiquitous ferns were bracken and two horsetails, *Equisetum arvense* and *E. telmateia* ssp. *braunii* which differs from the European ssp. *E. telmateia* Ehrh. in that the main stem coloration is greenish. Less common was *Blechnum spicant*. Though we saw the deer fern in many places, it was never abundant. Why is it so difficult to grow in eastern North America while its sister from eastern Asia, *Blechnum niponicum*, adapts happily. Conversely, *B. niponicum* is described as distinctly more difficult to establish in the Northwest by tour leader Olsen.

Polypodium scolieri was seen on bishop pine, *Pinus muricata*, just a short distance from the sea.

Lumber companies sometimes set aside a patch of virgin forest. Such was our last stop of the day, the Coast Redwood Grove in Rockport. Grand coast redwoods, *Sequoia*

sempervirens grew with lots of lady fern and sword fern above a carpet of *Oxalis oregona*, the redwood sorrel. There was also a tall *Trillium*, perhaps *T. ovatum*, and here again *Blechnum spicant*, *Equisetum telmateia*, and *Pentagramma triangularis*. The bulletin board at the trail's start had a thatched roof occupied by *Polypodium glycyrrhiza*. Today was the first time I had seen *Dryopteris expansa* and *Adiantum aleuticum*.

4 October

Graham Ackers

Traveling north along California's coastal strip, one encounters increasing numbers of the coastal redwood, *Sequoia sempervirens* and their associated parks, created to help preserve and display these iconic and ancient plants. We visited the Prairie Creek Redwoods State Park, a 14000-acre sanctuary of ancient redwood forest about 45 miles south of the Oregon border. For the day's activities, our party divided into two. One group explored some of the short trails near the Visitors Centre, and were also conveyed in smaller groups to Fern Canyon. My group walked the 6 miles of the James Irvine Trail from the Visitors Centre to Fern Canyon and the coast. Hugging the contours, this gently undulating path passed along spectacular redwood forest scenery. Some of these majestic trees were enormous and pristine. But others were damaged, having been felled by battering from the elements or simply old age, but many were regenerating, optimistic signs for generations to come. (Photo page 40)

Despite California's long hot summers, these coastal forests are lush under the influence of their maritime summer fogs, and this area was probably the best we visited for seeing a good sample of western forest fern species. Therefore in the list below are included some brief ecology notes.

Adiantum aleuticum. Along the trail, this species was restricted to the banks of creeks. However, at the end of the trail we reached the spectacular Fern Canyon, the vertical sides of which were completely covered with dense stands of this fern, stretching for many hundreds of feet. (Photo page 41) Although the river was low, it was difficult maintaining dry feet whilst negotiating the canyon floor, but the scenic rewards were worth every bit of the effort.

Athyrium filix-femina. Frequent in damper areas and wet flushes, some specimens with fronds up to 6 ft. long.

Blechnum spicant. The occurrence was sporadic along most of the trail, but on approaching nearer the ocean, it became the dominant species, superseding *Polystichum munitum*.

Dryopteris expansa. Occasional occurrence, specimens being rather small with delicate fronds, in contrast to the more robust plants seen in the Rockwood Redwood Grove the previous day. To most of us, this species seemed indistinguishable from Britain's *Dryopteris dilatata*!

Equisetum telmateia. Occasional stands in wet flushes.

Lycopodium clavatum. Only one rather poor specimen seen.

Pentagramma triangularis. Observed on the dusty track whilst driving back to the Visitor Centre.

Polypodium glycyrrhiza. Occasional, epiphytic on trees; a large colony observed near the shore at the end of the trail.

Polypodium scolieri. Also occasional on trees, but at higher elevations than the previous species. (photo page 41)

Polystichum munitum. This is the dominant fern of these forests, creating vast under-storey carpets. I often wonder how many billion specimens there are in western N. America – it seems to be everywhere!

Pteridium aquilinum. A rare plant (thankfully), only occurring in the lighter areas when leaving the forest and approaching the ocean.

Woodwardia fimbriata. One possible sighting on the dusty return track.

An exhilarating day ended with the viewing of a herd of Roosevelt Elk in pastures set aside for their grazing and a meal in a Brew pub not far from our Holiday Inn in McKinleyville.

5 October

Pat Riehl

Another beautiful day, sunny and cool. Today our first stop was Humboldt State University. Humboldt is north of San Francisco along California's redwood coast. We were scheduled to see the Bio-Science Building. It is a complex of multiple greenhouses connected by a common hallway. The greenhouses are filled with tropical plants: cactus, orchids, cycads, gingers and ferns and we all scattered looking for ferns.

The fern collection was wonderful but with the majority being tropical and some unlabelled it was a guessing game. I love these trips because even labeled plants get serious discussion as to the correct nomenclature.

The collection was the project of Dr. Walker a retired Humboldt University botany professor. Someone remarked it seemed like a teaching collection since no genus was collected in mass but there were lots of different genera. Plants included *Selaginella willdenovii* a climbing *Selaginella*, *Angiopteris evecta*, the mules foot fern, *Psilotum complanatum* and a variety of equisetums. There was something for everyone. There were several ferns we all coveted. One was *Cionidium moorei*, with green palmate fronds and brown dots of sori along the edge on the top of the frond. The sori were not flush on the pinnae surface but sat above the pinnae giving the whole fern a three dimensional effect. (Photo page 40) Another eye catcher, an unknown was a *Polypodium* with green hairless rhizomes and pinnatifid fronds. The rachis was a reddish purple, with this color extending into the pinnae where it touched the rachis while the rest was green. New growth had even more of this purplish cast. Amazing to see. A knock out *Pyrrosia* was hanging from the ceiling - a huge ball of a fern. All this together with other marattia, psilotum and various tree ferns filled the available space. I wish I could better describe all the different ferns but hardy ferns still baffle me so the tropical ones are hopeless.

After about 2 hours we headed back to the bus and the drive into the mountains. We climbed through areas of conifers, dry grasses and big leaf maples turning a beautiful yellow. The surroundings were dry, sunny and rocky. We half expected to start seeing xerics now!

We stopped inside 6 Rivers State Park for a quick look at ferns. These quick stops are never quick. We all scattered for parts unknown looking for the elusive dried up fern and we found some just off the road - *Pityrogramma triangularis* and an unknown *Selaginella*. The *Selaginella* was pretty crispy but we saw many clumps of the

Pityrogramma both in its green and shriveled state. And oh, yes - poison oak. However someone spotted *Polystichum imbricans* joining the presence of the ubiquitous *P. munitum*. After the grand dispersal, Kent nonchalantly announced he had found *P. californicum* just above the place where everyone had been searching. (Photo page 41)

On the other side of the road was a view of the magnificent mountains we were climbing through as well as a view down into a deep canyon filled with evergreen trees and a river.

This was a long day on the bus and the slide presentations of Juan Fernandez and Australia by Dan Yansura and Martin Rickard scheduled to fill in the time had to be postponed as the audio-visual equipment needed more tinkering than expected!

The day ended at a Days Inn in Sutter Creek. The Sutter Creek area is famous for the California gold rush of the 1840's. There was no time to look for gold though!

Fern Taxonomy Workshop, August 2009

Jo Laskowski
Des Moines, WA

On the highest part of Dyer Point, one of the many fingers of land that reach into the Atlantic on Maine's Downeast coast, Eagle Hill Foundation and the Humboldt Field Research Institute share the densely forested summit of Eagle Hill. Eagle Hill Foundation focuses on the interdisciplinary aspects of art and natural history, and the way in which both have been shaped by the natural world. Humboldt Field Research Institute works to engage the general public in an awareness of natural history and an understanding that the natural world is a universal heritage.

Concurrent courses make for some interesting interfaces. "Taxonomy and Biology of Ferns and Lycophytes," the week-long seminar I attended in August 2009, for instance, shared facilities and meals with a group of botanical artists who came to experience and conquer the unique challenges of using calf vellum for botanical illustrations. Erudite, spiritual, intuitive—they were a superb counterpoint to those of us who stumbled in to lunch after morning lecture—eyes glazed, brains struggling with vocabulary and taxonomic concepts and genetic revelations.

Our instructor was Robbin Moran, an important figure in both phylogeny and neotropical field work. The text for our group of six was his 2004 book, "A Natural History of Ferns." It was a nice bonus that Jim Harbison—a physicist by training and practice—who co-wrote the book's chapter on thin-film interference was enrolled in the class. We'd come for an intense immersion in field identification and to study the distinctive biology of ferns. We'd learn about their life cycle, hybridization, polyploidy, and unusual adaptations. One word of warning—especially in discussion about hybridization and polyploidy, new nouns and adjectives start flying at you, each with an

average length of four syllables!

But the experience of working in the lab and in the field made the information come to life. Robbin was an amiable presenter, and possessed the skills to interpret our stumbling questions and suss out what exactly it was that was unclear. He was assisted by his graduate student, Michael, and a visiting Brazilian scientist, Paulo. A comfortable, interactive atmosphere promptly developed. One day Paulo gave a short presentation on his home country, and his gorgeous slides of neotropical ferns and the amazing geography of Brazil were beautiful. Robbin brought herbarium specimens with him, some of which were over 100 years old. From them, we learned to distinguish the fine details that were the key IDs for the ferns we'd see each day. Much time was spent showing us the stages involved in fern reproduction, and our compound microscopes took us into the world of spores, archegonia and antheridia, and one day we were lucky to see the release and swimming of *Osmunda* sperm.

All students and their guests rose for an early breakfast. We emerged from assorted accommodations—dorm rooms in the building that also housed the laboratory/classroom, individual cabins, and tent platforms. Breakfast finished, our group would head over to our class/lecture session in the lab until lunch. After lunch, we went into the field, driving off-site on all but two days. We identified local ferns:

Athyrium filix-femina
Dennstaedtia punctilobula
Dryopteris campyloptera

Dryopteris carthusiana
Dryopteris cristata
Dryopteris intermedia

Dryopteris marginalis
Dryopteris x bootii
Dryopteris x triploidea

Gymnocarpium dryopteris
Onoclea sensibilis
Osmunda cinnamomea

Osmunda claytoniana
Osmunda regalis
Phegopteris connectilis

Polypodium appalachianum
Polystichum acrostichoides
Pteridium aquilinum

Thelypteris noveboracensis

In the field, we studied the promiscuous little *Dryopteris* genus, which is a happy hybridizer and especially so in the particular areas where we went. The hybrid complex is large, and the hybrids we saw did nothing to make themselves easily distinguishable to our eyes. I was distraught to learn that *Equisetum* has been re-classified as a fern, totally unwelcome information to one who ruthlessly obliterates it whenever possible. And I learned the meaning of “cypress swamp” when a hapless classmate—wearing flip flops, no less—slipped from a precarious foothold up to one knee in sucking muck. Footwear retrieval was successful.

And at the end of each field trip, we'd stop at Joshy's Place, to indulge in to-die-for ice cream cones—this despite the fact that we were returning to Eagle Hill for an amazing dinner. In pre-trip emails with Robbin, he referred to the fabulous meals I could expect at Eagle Hill. He informed me—with unabashed relish—that the traditional Wednesday

night entrée is lobster. The food was everything he implied, and then some.

A friendly rivalry between the “Artists” and the “Fernophiles” dominated at first. By the end of the week—over meals and shared evenings—“them” and “us” boundaries dissolved, into “thus.” And thus I left, richer and wiser and, oh yeah, don’t forget Joshy’s Place...



Back row, left to right - Michael Sundue, Charles Michaud, Robbin Moran, Lois Bienlien, Jean Howard, Jorn Stuehmeier, Paulo Labiak. Front row left to right - Jim Harbison, Jo Laskowski.

Taxonomy and Biology of Ferns and Lycophytes

August 22 - 28, 2010

Humboldt Field Research Institute, Steuben, Maine

Drs. Robbin Moran (New York Botanical Garden) and Carl Taylor (National Science Foundation) will teach this course about the identification, phylogeny, and ecology of ferns and lycophytes. Morning lectures will review the major families and place these in a phylogenetic context. The afternoon field trips will emphasize identification and ecology of local genera and species. The course will visit several habitat types along and near the eastern Maine coast to see as many species as possible. Herbarium specimens of northeastern species not found locally will be available for study. Besides identification, we will discuss the distinctive biology of ferns and lycophytes, such as their life cycle, hybridization, polyploidy, unusual adaptations (iridescent ferns, ant ferns, apogamy), biogeography, and uses of ferns by people. Carl Taylor will give several lectures on the biology and identification of quillworts (*Isoetes*), a group in which he is a world expert. For more information, contact the Eagle Hill office at:

www.eaglehill.us

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Two Milestone Events in Asiatic Pteridology

Chris Page

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Two internationally-important events in pteridological history recently took place on the same continent. Either would have ranked as milestone events in their own right. Together they marked and celebrated both a burgeoning and a blossoming of pteridology within Asia. The first, in August 2007, saw the first ever Russian Pteridological Conference, held in the city of Tomsk in Siberia. The second, in November-December 2008, celebrated the 25th Anniversary of the Indian Pteridological Society, held in the city of Lucknow, India. Both were momentous and unforgettable events, each appropriately-marking and celebrating the development and progress of strong centres of scientific interest in pteridology, across this vast continent. Importantly, each was almost entirely home-grown. I was privileged to have been invited to attend each, somewhat in the capacity of British Overseas-Ambassador for Pteridology. So it is a pleasure to here reflect a little on the strength and diversity of each of these pivotal and dynamic pteridological events.

The First Russian Pteridological Conference

The first ever Russian Pteridological Conference was held in Tomsk State University, Tomsk, Russia, during August 2007. Approximately 35 delegates (with a total of 46 in the authorship of the papers) gathered for three days of lectures, followed by an optional excursion to see the pteridophytes of the Altai Mountains, on the border of south Siberia and Mongolia, 2 days drive from Tomsk. Both the lectures and field meetings were highly successful ones, bringing together pteridologists from all parts of Russia, literally from Moscow and St. Petersburg to the Far East of Russia (between which Tomsk in Siberia is relatively central). I had the honour to be one of only two non-Russian participants (the other was from the Ukraine).

My object in going to Russia was to try to experience, first-hand, through this meeting, the level of interest in pteridological research across this enormous country, and get to know a little of its focus and diversity as represented at this unique first gathering. If I could possibly sense whether the establishment of any closer east-west links would be felt to be useful to the independently-formed interests in pteridology in Russia, then any such developments might help to bridge what has previously been a traditional barrier to scientific information flow in both directions. The whole conference was thanks to the vision, organisational ability and sheer hard work of Professor Irina Gureyeva, Director of the Krylov Herbarium of Tomsk State University, who conceived that the time was right to call for a Russian pteridological conference, and to Professor Alexander Shmakov, Director of the South Siberian Botanical Garden at Barnaul, who organised the field week, and its accommodation and travel throughout.



Cionidium moorei

Bio-Science greenhouse at
Humboldt State University.

Photo courtesy of Sue Olsen

**New growth on a
Polystichum setiferum cv.**

Photo courtesy of Sue Olsen



***Dryopteris arguta* along a
dry roadside**

Photo courtesy of Sue Olsen

***Sequoia sempervirens*
Coast Redwood Grove**

Photo courtesy of John Acock





Polypodium scouleri
Beach side at Fern
Canyon

Photo courtesy of Sue Olsen

View from the
Mendocino Coast
Botanical Garden

Photo courtesy of
John Acock



Fern Canyon

Photo courtesy of
Richie Steffen

Polystichum californicum
at 6 Rivers State Park

Photo courtesy of
Richie Steffen



The Russian lectures

Although I had not previously been to Russia, initial diffidence on my part was rapidly overcome by the realisation that I was honoured by being scheduled to give the opening conference lecture. Also, after three days subsequently meeting Russian pteridologists and listening to many fascinating presentations, I was invited to then close the meeting, with discussions about its contents and future direction. Barriers of language had initially concerned me. But thanks to the enormous support of the conference organiser, Professor Irina Gureyeva, and the additional extremely able daily help throughout the conference and beyond of a highly fluent and scientifically highly competent translator, Yelena Zuyeva, any potential barriers were not just overcome but were effectively dissolved to the extent that I found I could even participate in discussions. Indeed, the liquidity which we collectively achieved surprised me. What might otherwise have been difficult, in actuality became wonderful opportunities for the exchange of experiences, especially around field-related aspects of Pteridophyta, on which many Russian pteridologists are especially closely focused.

Lectures varied widely in their duration, and the conference benefited greatly, I felt, from not having the rigid timetables which we are used to in the west. For example, several young scientists were able to give short (5-10 minute) presentations of work, and these were intermixed with longer research papers, some clearly the results of many years of dedication. This made for great interest of listening, and was helpful in indicating work actually proceeding, rather than all necessarily representing complete final papers. Despite these great variations in length, lectures were direct and never overly complex. Depth of topics covered seemed particularly thorough, and speakers also had no difficulty in demonstrating where their studies were going and what they would be doing in future. There was a clear level which balanced professionalism with informality, and this was refreshing. Characteristically, all were also beautifully illustrated, with considerable information thoughtfully presented diagrammatically, so that if I lost the thread in detail, I could still grasp much of the theme from combinations of the illustrations and plant names used! So I seemed to understand far more than I thought I would. All, it seemed to me, were presented extremely professionally and confidently, even by the many young people.

The total diversity of topics covered within the Pteridophyta was wide. Subjects fell into two broad groupings: essentially floristic / phytogeographic / ecological / conservation and essentially taxonomic / biomorphologic / developmental / populational / demographic. Each of these general fields has considerable importance in Russian pteridology, and I was impressed by the diversity of the topics within each area, including several aspects which in the west we have given much less study. Importantly, a majority of papers had clear field-related foci, and often from this basis included both observational and experimental work. I think it is especially in this important area that Russian pteridology is both factually-rooted and clearly excels. Healthy discussions followed many presentations, and several times authors were keen to know how their ideas compared, with and would be viewed by, pteridologists in the west. With clear, considerable, sometimes novel, and often eye-opening interest was my general conclusion.

At the human level, what struck me strongly in looking around at the Russian pteridologists was threefold. First, the very great proportion of women in Russian pteridology.

Men are a definite minority. The second was in what a friendly and relatively informal, but well-organised, atmosphere the whole conference and the whole field meeting seemed to run, and I came to feel very much part of their team. The third is that when I look around at our meetings in the west, there is always a bias towards a demographic age class of more mature individuals, of which I am certainly no exception. When I similarly looked around at the Russian participants, I was struck by how very many young faces there were, who gave interesting presentations, who were eager to discuss the plants as we went, and who in the field, were often the first to disappear up mountainsides with great enthusiasm and sharp-eyed success.

All events were memorable experiences, and I am left with the impression of a strong and growing interest in Pteridophyta within Russia as a whole. Following the dissolution of any political barriers to contact, I felt that there was much eagerness to link more closely with the west. I would say too, from this experience, that pteridology in Russia has its own, independent strengths. Its strong dedication in relating results to field aspects is, I feel, especially important in areas so heavily overlooked here. It was just my sort of pteridology, in which emphasis was always on gaining greater understanding of how pteridophytes do what they do, and achieve what they do, in the field.

The Siberian field meeting

Following the lectures, delegates set off on a well-organised optional week's excursion by minibus to the Altai Mountains, on the border of South Siberia and Mongolia. The vegetation of steppe, rivers and forests was far from what I expected in two important dimensions. I had always presumed, that in the very short summer available for growth in Siberia generally and especially in the mountains, that vegetation would be somewhat stunted and spartan under these demanding climatic environments. Quite the opposite.

I was amazed by the luxuriance which the Siberian vegetation achieves in the short growing-season available. For although its season is short, its growth is everywhere rapid and vigorous, and by late August most individual plants had become large and surprisingly luxuriant throughout virtually the whole of the range of habitats seen. The sheer verdure of this growth clearly responds to the short but quite sunny and warm summer conditions of these clearly continental interior climates. Indeed, at moments, the pristine condition of the habitats and the sheer verdure of both the plant growth and the associated wildlife in Siberia, seemed more like the tropics where I had been only a fortnight before, and I had to stop and remind myself where on the globe and in what climate I now actually was !

My surprise over the luxuriance of the vegetation was surpassed only by surprise over its second dimension: its diversity. We met multiple species within *Athyrium*, *Gymnocarpium*, *Asplenium*, *Polypodium* and *Woodsia*, the latter three often in large clumps on rocks. This diversity was further enhanced by the presence in Siberia also of unusual fern genera such as the polypodiaceous *Lepisorus* (*L. albertii*), aspleniaceous *Camptosorus* (*C. sibiricus*) and the striking cheilanthoid *Aleuritopteris* (*A. argentea*). Further, within *Woodsia*, for example, a total of at least ten species are reported from the region, of which we saw several. My own view is that this sheer diversity might well have been more like the vegetational diversity we too would have had in the mountains of western Europe including Britain before the Pleistocene glaciations came.

Indeed, the whole of the richness of the ferns, as well as associated flora, left a vivid impression on me that it was like the Scottish flora on steroids !

We visited many patches of differing forest types, on valley sides, beside rivers, and throughout the mountainous terrain. All were fascinating. The forest understorey vegetation seemed to be one in which patches of larger forest ferns are frequent to locally dominant. In better-drained forest, pinewood of *Pinus sylvestris* dominated, and in these forests, open stands of *Pteridium* (*P. pinetorum* subsp. *sibiricum*) occurred extensively. Indeed, the overall distribution of this pine and this bracken mirror each other (hence the species name). The large and typically widely-scattered often nearly tripartite blades of this *Pteridium*, standing at stiffly slightly assurgent angles, were beginning to adopt their characteristic bright-yellow autumn colours by early September. With slight undulations in topography, and differing drainage patterns, the forest understorey changes to slightly damper terrain, and the fern communities largely to ones dominated by *Matteuccia* (*M. struthiopteris*), with more scattered *Dryopteris* (including *D. carthusiana*), and especially multiple *Athyrium* species, and we had much debate and discussion especially around the many highly varying *Athyrium* encountered. *Polystichum braunii* occurred especially in sites which linked between the valley floor and rocky sides.

Almost wherever rocky outcrops arose, many smaller-statured ferns were often present with sometimes considerable local frequency. These rocky outcrops occurred in and around the forests, usually as partly damp and shaded bluffs or as more sunny sites, either wholly beneath the forest canopies or emerging above them. Such bluffs were especially widely present along flanks of the major river valleys, and all those I examined were all of highly foliated mica schist rock, which presented numerous exposures of calcareous veins. The ferns encountered included the genera *Asplenium*, *Woodsia*, *Gymnocarpium* and *Polypodium*, mostly as multiple species, while in sunnier rocky niches, the small and attractive fronds of *Aleuritopteris* (which I had never previously seen) were present, and which had been appropriately graphically used as the emblem of the conference. Within the Altai region, luxuriant growths especially of *E. hyemale* and *E. variegatum* occurred along some of the white sandy and gravelly spits beside the fast-flowing mountain torrents of the Katun river carrying turquoise glacial melt water even in summer from high in the Altai. Challenged by me to do so, one of the students found *E. x trachyodon* too, which I was able to confirm, not previously recorded for Russia, as were several other of our hybrid horsetail finds across Siberia.

As an integral part of forest fern life-cycle turnover, we also examined in the field, sites of origin of new prothallial and young fern growth for several of the forest-floor fern species, in which there was much local expertise based on repeated detailed field observations. We saw clear demonstrations of how, for many forest ferns, life first began not on the forest floor itself, but on micro-sites such as especially those of decaying log stumps and fallen decaying trunk debris. Here periodic disturbance of woody fragments during decay processes reveals fresh breakage surfaces of clean moist dead wood, to produce initially naked and competition-free niches in moist, sheltered sites. Within these 'safe-sites', and especially where protected within slight depressions and crevices, freshly arriving spores then regularly succeed in producing successful prothallial growth and usually small numbers of individual sporophytes, depending largely on the size of the micro site. The sporophytes arising at such sites eventually become part of the over-

all forest floor community as the wood mound continues to decay away. These sites can also be ones of multiple-prothallial contact, promoting opportunity for out breeding and also favouring some inter-species opportunity for hybridisation.

Against this backdrop, I found the field skills of the Russian botanists to be overwhelmingly superb. Their entirely independently home-grown and strongly field-oriented perspectives, were ones from which I learned much, and was stimulated. These skills, based on detailed repeated observations, passed-on to their students, make laboratory-based approaches used in the west seem dramatically disengaged from the reality of the field. Here, we have much yet to learn.

At the end of the conference, the possible formation, from here on, of a Russian Pteridological Society was being discussed. By experiencing the enthusiasm of the many young members, I saw that pteridology has now a strong and diverse future in Russia. In closing the conference, I congratulated them all on what they had achieved and the directions in which they had chosen to go, which were collectively of a quality at least on a level comparable to the west, have their own strengths, and indeed, I felt, benefited greatly by their differences. I wished the many young participants especially, of whom I feel sure we will hear more, a long and successful pteridological future.

Finally, I was really honoured to have been invited to participate in the lectures and in the subsequent field week of Russia's first ever pteridological conference. I found all of the Russians I met most friendly and welcoming, and with whom, after the week in the field, I felt I had come to form part of their pteridological team. I was particularly grateful to Professor Irina Gureyeva for facilitating my visit and making me so welcome, and to Yelena Zuyeva and several of the students for their untiring support in making running translations in both directions, to the degree that I never felt left-out, and that we planned our activities and had informal discussions constantly. Seeing Siberian pteridophytes in the excellent company of so many young Russian botanists was, for me, an unparalleled privilege, which I knew few, if any previous westerners must have had the fortune to experience. I felt the Russian students were, in many ways, exactly the same, and as similarly dedicated, as my students 'back home', and I am left with an indelible impression that we have seldom actually appreciated this.

The Silver-Jubilee Symposium of the Indian Fern Society

India is an enormous country. The latitudes of this sub-continent span from 35°N in Kashmir to 08°N at its southern tip. The south is manifestly tropical, and at the northern boundary, the Himalayas offers every climate from hot dry lowlands rising through dramatic scenery of lakes and mountain valleys to the snowline and beyond. Across India, a very considerable range of pteridophytes is consequently present, concentrated especially in the various upland areas - from the tropical rainforests of the Western Ghats of the southern peninsular region to the well-zoned vegetation of the Himalayan chain, to the high-rainfall (the world's wettest) corner of the north-east frontier region adjoining former Burma (Myanmar) and China. Several worthy local fern books reflect this: published by different authors on the fern floras of various mountain regions of India, these reflect the extraordinarily rich pteridological diversity that India contains, and upon which home-grown pteridological study is being focused.

For the last 25 years (1983-2008), India also has had its pteridological interest fostered and encouraged by its own highly-active Indian Fern Society. In November 2008, this

Society convened a conference to mark its Silver Jubilee. CNP (Chris N Page) was one of two British attendees, along with Christopher Fraser-Jenkins, who himself has long been actively working on taxonomic issues especially within the mountain flora of the Himalayas. There were several attendees especially from other Asiatic countries, and I counted more than one hundred Indian participants - a certain reflection of the present and growing interest in ferns in this enormous country. Not only was the event the Silver Jubilee for the IAF, but the conference also marked and celebrated effectively the double-event of the 80th birthday of Professor S.S.Bir. Professor Bir is, himself, the founder of the Indian Fern Society and Editor of the Indian Fern Journal, and has thus remained one of the main driving-forces in the development of this important Indian Fern Society across this pteridologically-rich region.

The symposium was held in the city of Lucknow, which is about 7 hours train-ride from Delhi. Lucknow is the headquarters of the Indian Botanical Survey, who are well-equipped with laboratory facilities and were actively extending their herbarium building while we were there. The papers presented in this week-long symposium provided a particularly important reflection of the richness of the Indian pteridophytes, and the studies which are continuing to build upon them, and it was good to so-fully appreciate how strong and actively-growing is pteridology in India. Papers presented covered a very broad span, from fossil ferns of the Rajmahal Hills (India, importantly, was once part of Gondwanaland), to a broad range of papers on the living species. These spanned systematic / morphological / phylogenetic / distributional / cytological / genetic / pharmacological / evolutionary / ecological and important conservational perspectives on pteridophyta, with a total of 75 authors and co-authors in the papers. The geographic breadth of contributions also spanned contributions from adjacent regions including the fern floras of Russia, China, Nepal, Japan and Vietnam, as well as high-mountain fern communities and high-rainfall tropical epiphyte ferns more generally, plus a few contributions from further afield. So in many ways the symposium was broader than a focus on India alone, and was effectively one which brought in taxonomic and especially conservational issues for Pteridophyta to a strong focus across much of the eastern Asian region.

We heard several important presentations of surveys of the role of morphology to taxonomic, developmental and biological understanding, and important assessments of conservationally threatened species both within India and beyond. Highlights in widening overseas experience were in the richness of the fossil ferns and their reconstructions, the diversity of especially Polypodiaceous and Davalliaceous ferns and their ecology across India and into China and south east Asia, the amazing ecological diversity, within peninsular India, of both the genera *Isoetes* and *Lycopodium*, and the diversity of water-ferns and their potentials in eastern Asia for phytoremediation of heavy-metal sites. It was significant to realise the large contributions which pteridophytes make to many of these issues through the wet tropical and montane floras of India and eastern Asia more generally. There is too a growing awareness of fern conservational significance, and we were privileged to see how micro propagation of ferns is under active development in India, as one important back-up to developing conservation strategies across this region. Overall impressions were of an extremely well-organised, thoughtfully-assembled and far-stretching pteridophyte meeting, reflecting a strongly growing interest in Pteridophyta across eastern Asia, about which I am sure we will be hearing

much more.

The conference was organised by the staff in Lucknow (especially Dr P.B. Khare) on behalf of the Indian Fern Society, and my thanks are due not only to Professor S.S. Bir, but also to Dr P.B. Khare and Dr K.C. Sanhi for their considerable logistic help throughout the week.

Conclusions

My overall impressions of each of these conferences is that they have both been wonderfully dynamic meetings. Each reflected to the full the great diversity of pteridological interest which exists within Russia and India, and indeed, across Asia as a whole, and the ways in which research is being developed on Pteridophyta around strongly home-grown abilities and strengths.

The Proceedings of the First Russian Pteridological Conference (186 pages, containing 34 papers), edited by Professor I.I. Gureyeva, have been published in a small and neat volume in Russian (Published 2007 by Tomsk State University, Russia, ISBN 5-7511-1943-6). The Proceedings of Indian Pteridological Symposium have been produced as the Indian Fern Society Silver Jubilee, under the title '*Perspectives in Pteridophytes*' (499 pages, containing 39 papers, with forewords by Professor A.K. Sharma and Professor Kunio Iwatsuki, plus a dedication to and biographical sketch of Professor S.S. Bir). It is edited by S.C. Verma, S.P. Khullar and H.K. Cheema (hardback, published 2008 by Bischen Singh Mahendra Pal Singh, 23-A New Connaught Place, PO Box 137, Dehradun 248001, Uttarakhand, India, ISBN 978-81-211-0702-0).

Meetings such as these, whether they are called conferences or symposia, have important functions in both drawing together and reflecting the state-of-development of a subject, and in bringing together those involved in its research. At a time when, both in Britain and across Europe more widely, pteridology (let alone plants) form a subject no longer found in most universities, pteridologists themselves are rapidly becoming threatened species in their own right! It is therefore doubly refreshing to find and experience these strongly developing pteridological interests remaining so healthy in Asia, in countries which are, themselves, each whole pteridological regions. It has been my impression, at both of these conferences, that the manifold excitement of future research which the subject still generates, were clearly reflected in the bright eyes and minds of many of the younger participants whom I met. Thus both of these important events reflected, I think, not just the state of pteridology in these large parts of the Old World at present, but I hope have very much helped, in the minds of the young, to have set at least some of the directions of pteridology in the future.



The numbers attending the Indian Fern Society's 25th Anniversary Symposium attest to the continuing interest that Pteridophyta attract in the subcontinent. Photo courtesy of Chris Page

Polystichum setiferum - Soft shield fern

James R. Horrocks
Salt Lake City, Utah

The species epithet means "bristle-bearing" although the bristles are usually soft to the touch in most varieties. *P. setiferum* "et al" is a highly variable species native to the lowlands of southern Europe and the British Isles. It is quite common in the south and west of England and in Ireland. It is rare in Scotland, although it can be locally abundant on some of the western isles. It is terrestrial in damp woodlands and hedgerows, hence the local name hedge fern. It is also occasionally found in rocky clefts. The soft shield fern is at its best in slightly moist soils that are neutral or range from slightly acidic to slightly alkaline. On the surface, there might seem to be some disagreement as to its requirements as far as humidity is concerned. Mickel states that it needs "consistently high humidity" while Hoshizaki insists that it does "not like very high humidity". Temperature is the key. This species suffers in hot humid climates but thrives in cooler humid areas. In northern Utah, where the humidity is at the low end during the summer months, the type species and the variety 'Divisilobum' seem to do fairly well if a microclimate can be maintained, but finely divided cultivars do not fair well at all.



Reginald Kaye tells us: "This species has given rise to more varieties than any other British fern; over three hundred and sixty were described by Lowe in 1890. Druery, by rejecting inferior and redundant forms, reduced this number to one hundred and seventy-five in 1902. Today we are left with a greatly reduced list." A number of variants have been lost to cultivation over the years, some during and after World War II. In 1963, Jimmy Dyce, who had a keen interest in *P. setiferum* cultivars, authored a specialist handbook entitled "Variations in Polystichum in the British Isles" in which he adapted Lowe's analysis of *P. setiferum*. Richard Rush, commenting on the "innumerable cultivars" of which many are in cultivation, adds: "In general, names are descriptive. Names such as 'Divisilobum' can embrace many diverse groups, but unfortunately plants which are not notably distinctive have been afforded the further refinement of individual naming (or are misnamed as celebrated varieties of the past) while superior plants remain under the blanket heading. There are excellent unnamed variants in British gardens." And from Hoshizaki: "The cultivar names are greatly confused in the trade and among collectors, creating controversy among growers." Depending on the author, said cultivars are grouped into crested forms, finely cut forms, divided forms, dwarf forms, congested forms, plumose forms, etc. Some beautiful photographs of various cultivars can be found in Martin Rickard's "The Plant Finders Guide to Garden Ferns" and in Sue Olsen's "Encyclopedia of Garden Ferns", showing the astonishing variety of some of the best known and some lesser known,

including the feathery 'Plumosum-divisilobum Baldwinii', the extremely rare tasseled 'Gracillimum Cristulatum', the striking 'Leinthall Starks' and the very elegant 'Plumosum Bevis', the latter being originally classified as a variant of *P. aculeatum*. In 2005, the British Pteridological Society published "Polystichum Cultivars: Variation in the British shield ferns" (Dyce et al.) with a focus on *P. setiferum* which is divided into thirty-two groups in an attempt to organize the bewildering array of diversity within this species. It might also be mentioned that the stories behind some of the discoveries of these variants are a fascinating read. (See page 31.)

P. setiferum is often confused with its close relative and fellow British and European subject, *P. aculeatum*, the hard shield fern. The confusion comes with good reason. The great variation in the two causes considerable perplexity. As a general rule, *P. setiferum* is soft to the touch, although there are exceptions, and not glossy or leathery, whereas, *P. aculeatum* is leathery and, compared to *P. setiferum*, is somewhat glossy. But this is only relative, since, compared to Asian species such as *P. neolobatum*, *P. aculeatum* is not very glossy at all, but comparatively dull. *P. setiferum* has a longer stipe with the lower most pinnae nearly as long as those found mid-frond. The stipe in *P. aculeatum* is shorter, less than one-sixth the length of the frond, and the lowest pinnae are only about half as long as the middle pinnae. The spores of *P. setiferum* are light brown whereas in *P. aculeatum*, they are darker brown. Due to the variation in both species, often times, the only way to be confident in their true classification is to resort to confirmation through a chromosome count. As was mentioned, *P. aculeatum* 'Pulcherrimum Bevis' was reassigned in 1978 as *P. setiferum* 'Plumosum Bevis', using this technical procedure. Adding to the confusion, a natural hybrid is known between *P. setiferum* and *P. aculeatum* named *P. x bicknellii*, found occasionally where the parents intermingle. It is, however, barren. The soft shield fern should not be confused with the North American species, *P. setigerum*, spelled with a "g" rather than an "f". This is the true so-called Alaska fern, or more properly, Alaskan sword fern, native to Alaska and British Columbia, and a natural hybrid between *P. braunii* and *P. munitum*. It is rarely cultivated. The nursery trade often mistakenly labels *P. setiferum* as Alaska fern. The author encountered this even last year (2009) at a local nursery.

Description: The rhizome is very stout, erect, and covered with the bases of old fronds. The frond bases form buds which develop into subsidiary crowns. The fronds, being soft in texture, are considered semi-evergreen, remaining green over winter in milder climates until the new growth appears in spring. The fronds can be two to even five feet in length in favorable locales. Most cultivars display more or less arching fronds that in some may be almost horizontal, held relatively low to the ground, but others are held boldly upright as in the rare 'Cristato-pinnulum'. The fronds of *P. setiferum* are mostly bipinnate, although tripinnate cultivars are well known. The stipe and rachis are covered with golden scales which appear glistening white or silver in the new uncurling fiddleheads. The stipe is grooved and about one-fifth to one-sixth the frond length. The fronds are composed of thirty to forty pairs of linear-lanceolate pinnae which often curve toward the frond apex. The color can be pale green to deep green, depending on the cultivar or soil PH. The pinnules have a distinct stalk where they are broadly attached to the rachis and are serrate, the teeth terminating in bristles. There are abundant sori, located midway between the margin and the midrib, and covered by circular peltate indusia. The spores are light brown. Curious bulbils occur in some

varieties, particularly 'Divisilobum' and 'Acutilobum'. The bulbils are found mostly along the frond midrib and can be the only means of rapid reproduction in sterile forms.

Culture: This species is hardy to zone 5 but needs protection in hot climates if it is to survive. A cool, humid microclimate is best where the soil is kept cool and damp, but not soggy. It is said to do well in low-light conditions, but open shade or medium light are more to its liking. In slightly acid soils, it turns a deeper green. It is also happy in neutral to slightly alkaline soils. Nestled next to or between large rocks is helpful, as the rocks provide a cool root run. The soft shield fern is quite attractive contrasting with cyrtomiums or other coarse species. It should be given ample room as it tends to be clump-forming in favorable spots. Spore culture often yields interesting progeny which sometimes are an improvement. Some come true from spore while others do not. Sue Olsen mentions tissue culture, a boon to increasing crops, particularly for those that are difficult to grow by other means. The soft shield fern and its many cultivars are a welcome and beautiful addition to the garden if cool, humid conditions can be provided.

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Fern Foray participants at the Golden Gate Bridge

Left to right - Richie Steffen, Kathryn Crosby, John Acock, Graham Ackers, Alan Ogden, John Scott, Pat Riehl, Pat Kennar, Dan Yansura and Kent Kratz - The others were studying the ferns on the buttress!!!

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The tour is being organized by Naud Burnett who treated us to such a fantastic tour in Texas in 2007. He will be ably assisted by Kent Kratz .

For further information and to indicate an interest please contact :

Naud Burnett or Kent Kratz at Casa Flora, PO Box 41140, Dallas, TX 75241 or trip@casaflora.com.

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